Rational Preference and Rationalizable Choice

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A decision maker(DM) is characterized by two binary relations. The first reflects the DM's judgments about his welfare and wellbeing, his (psychological) preference. The second describes the DM's choice behavior, his (revealed) choice. As argued by Mandler (2005), rationality requires that preference imply choice, that preference be transitive but not necessarily complete, and that choice be complete but not necessarily transitive. In the context of decision making under uncertainty, we propose axioms that aim at simultaneously describing the rationality of these two relations. These axioms allow their joint representation by a single set of probabilities and a single utility function. Specifically, it is rational to prefer *f* over *g* if and only if the expected utility of *f* is at least as high as that of *g* for all probabilities in the set; it is rational(izable) to choose *f* over *g* if and only if the expected utility of *f* is at least as high as that of *g* for some probability in the set. In other words, preference and choice admit, respectively, a representation "a la Bewley" (2002) and "a la Lehrer and Teper" (2011). Our results also provide a probabilistic foundation for a decision analysis procedure called robust ordinal regression, proposed by Greco, Mousseau, and Slowinski (2008), as well as for the associated structure called NaP-preference (necessary and possible preference) proposed by Giarlotta and Greco (2013).